

Claims

- [c1] 1. An automatic shift control apparatus for a bicycle that has a front transmission and a rear transmission, each transmission having a plurality of gear steps, wherein the apparatus comprises:
a travel condition sensing unit; and
a control unit that operates one of the front transmission and the rear transmission in priority to the other one of the front transmission and the rear transmission based on the travel condition.
- [c2] 2. The apparatus according to claim 1 wherein the control unit operates the one of the front transmission and the rear transmission in priority to the other one of the front transmission and the rear transmission based on a rate of change of the travel condition.
- [c3] 3. The apparatus according to claim 2 wherein the control unit operates the one of the front transmission and the rear transmission in priority to the other one of the front transmission and the rear transmission when there is a high rate of change of the travel condition.
- [c4] 4. The apparatus according to claim 3 wherein the travel

condition is bicycle velocity.

- [c5] 5. The apparatus according to claim 3 wherein the travel condition is crank RPM.
- [c6] 6. The apparatus according to claim 1 wherein the control unit normally sequentially shifts the rear transmission through its plurality of gear steps in response to a first travel condition, and wherein the control unit shifts the front transmission in priority to the rear transmission in response to a second travel condition that is different from the first travel condition.
- [c7] 7. The apparatus according to claim 6 wherein the control unit shifts only the front transmission to achieve a combined gear step of the front and rear transmission in response to the second travel condition.
- [c8] 8. The apparatus according to claim 6 wherein the first travel condition is a velocity, and wherein the second travel condition is acceleration.
- [c9] 9. The apparatus according to claim 8 wherein the control unit shifts only the front transmission to achieve a combined gear step in response to the second travel condition.
- [c10] 10. The apparatus according to claim 9 wherein the first

travel condition is bicycle velocity, and wherein the second travel condition is bicycle acceleration.

[c11] 11. The apparatus according to claim 9 wherein the first travel condition is crank velocity, and wherein the second travel condition is crank acceleration.

[c12] 12. The apparatus according to claim 1 wherein the control unit compares the travel condition to an upshift value to determine the one of the front transmission and the rear transmission to upshift.

[c13] 13. The apparatus according to claim 12 wherein the control unit compares the travel condition to an upshift value for at least two gear steps above a current gear step to determine the one of the front transmission and the rear transmission to upshift.

[c14] 14. The apparatus according to claim 13 wherein, when the travel condition passes an upshift value for at least two gear steps of the rear transmission above a current gear step of the rear transmission, the control unit upshifts the front transmission.

[c15] 15. The apparatus according to claim 14 wherein, when the travel condition passes an upshift value for at least two gear steps of the rear transmission above a current gear step of the rear transmission, the control unit up-

shifts the front transmission by one gear step.

- [c16] 16. The apparatus according to claim 1 wherein the control unit compares the travel condition to a downshift value to determine the one of the front transmission and the rear transmission to downshift.
- [c17] 17. The apparatus according to claim 16 wherein the control unit compares the travel condition to a downshift value for at least two gear steps below a current gear step to determine the one of the front transmission and the rear transmission to downshift.
- [c18] 18. The apparatus according to claim 17 wherein, when the travel condition passes a downshift value for at least two gear steps of the rear transmission below a current gear step of the rear transmission, the control unit downshifts the front transmission.
- [c19] 19. The apparatus according to claim 18 wherein, when the travel condition passes an upshift value for at least two gear steps of the rear transmission below a current gear step of the rear transmission, the control unit downshifts the front transmission by one gear step.
- [c20] 20. The apparatus according to claim 1 wherein the travel condition sensing unit senses bicycle velocity.

- [c21] 21. The apparatus according to claim 1 wherein the travel condition sensing unit senses bicycle acceleration.
- [c22] 22. The apparatus according to claim 1 wherein the front transmission comprises a plurality of front sprockets and an electrically controlled front derailleur to engage a chain among selected ones of the plurality of front sprockets, and wherein the rear transmission comprises a plurality of rear sprockets and an electrically controlled rear derailleur to engage a chain among selected ones of the plurality of rear sprockets.